

**SAND LAKE NATIONAL WILDLIFE REFUGE COMPLEX
Columbia, South Dakota**

**ANNUAL NARRATIVE REPORT
Calendar Year 2003**

**NATIONAL WILDLIFE REFUGE SYSTEM
FISH AND WILDLIFE SERVICE
U.S. DEPARTMENT OF THE INTERIOR**

REVIEW AND APPROVALS

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----- Refuge Manager	----- Date	----- Refuge Supervisor Review	----- Date
----- Regional Office Approval		----- Date	

INTRODUCTION

Sand Lake National Wildlife Refuge, located in northeastern South Dakota, was established in 1935 to preserve critical habitat for nesting and migrating waterfowl. The 21,498 acre refuge consists of 11,000 acres of marsh and open water, 7,417 acres of grassland, 2,581 acres of cropland, 200 acres of woodland, and 300 acres of administrative land. The refuge lies in the rich, rolling lowlands of the James River valley. The James River, running 600 miles north and south through the Dakotas, forms a natural flight path for migrating birds. Each spring and fall, thousands of ducks, geese, and other migratory birds stop at Sand Lake. The refuge is an important nesting area for ducks, Canada geese, and many species of marsh and water birds. This unique area also provides excellent habitat for resident game species, such as white-tailed deer, ring-necked pheasant, and furbearers. Each year, large numbers of people come to the refuge to observe, photograph, or hunt the abundant wildlife the refuge provides.

A eight-county Wetland Management District is also managed out of the Sand Lake Headquarters. The Coop Agreement with the Corps of Engineers was terminated in mid-2001 thus removing Pocasse as a national wildlife refuge.

The 12,000 square mile Sand Lake Wetland Management District, located in north-central South Dakota, encloses a rich diversity of wildlife habitat. The eight county district extends west to the Missouri River and includes part of the James River Basin to the east. The western portion of the district is part of the Coteau du Missouri and is composed of intermediate and short grass prairie. Tall grass prairie and agricultural lands comprise the eastern portion. The headquarters is located at Sand Lake National Wildlife Refuge.

Land is acquired by the Aberdeen Acquisition Office. Both fee and easement interests are being obtained.

TABLE OF CONTENTS

A. HIGHLIGHTS

B. CLIMATIC CONDITIONS

C. LAND ACQUISITION

1.	Fee Title	Nothing to Report
2.	Easement	Nothing to Report
3.	Other	Nothing to Report

D. PLANNING

1.	Master Plan	3
2.	Management Plan	Nothing to Report
3.	Public Participation	3
4.	Compliance with Environmental and Cultural Resource Mandates	4
5.	Research and Investigation	4
6.	Other	4

E. ADMINISTRATION

1.	Personnel	4
2.	Youth Program	Nothing to Report
3.	Other Manpower Programs	Nothing to Report
4.	Volunteer Program	7
5.	Funding	8
6.	Safety	9
7.	Technical Assistance	9
8.	Other	9

F. HABITAT MANAGEMENT

1.	General	11
2.	Wetlands	11
3.	Forests	Nothing to Report
4.	Croplands	13
5.	Grasslands	14
6.	Other Habitats	Nothing to Report
7.	Grazing	15
8.	Haying	16
9.	Fire Management	16
10.	Pest Control	16

11. Water Rights	Nothing to Report
12. Wilderness and Special Areas	Nothing to Report
13. WPA/Easement Monitoring	Nothing to Report

G. WILDLIFE

1. Wildlife Diversity	17
2. Threatened and/or Endangered Species	17
3. Waterfowl	17
4. Marsh and Water Birds	18
5. Shorebirds, Gulls, Terns, and Allied Species	18
6. Raptors	Nothing to Report
7. Other Migratory Birds	Nothing to Report
8. Game Mammals	20
9. Marine Mammals	Nothing to Report
10. Other Resident Wildlife	21
11. Fisheries Resources	21
12. Wildlife Propagation and Stocking	Nothing to Report
13. Surplus Animal Disposal	Nothing to Report
14. Scientific Collections	Nothing to Report
15. Animal Control	21
16. Marking and Banding	21
17. Disease Prevention and Control	23

H. PUBLIC USE

1. General	23
2. Outdoor Classrooms - Students	25
3. Outdoor Classrooms - Teachers	25
4. Interpretive Foot Trails	25
5. Interpretive Tour Routes	25
6. Interpretive Exhibits/Demonstrations	26
7. Other Interpretive Programs	26
8. Hunting	27
9. Fishing	28
10. Trapping	29
11. Wildlife Observation	29
12. Other Wildlife Oriented Recreation	Nothing to Report
13. Camping	30
14. Picnicking	30
15. Off-Road Vehicling	Nothing to Report
16. Other Non-Wildlife Oriented Recreation	Nothing to Report
17. Law Enforcement	30
18. Cooperating Associations	31
19. Concessions	Nothing to Report

I. EQUIPMENT AND FACILITIES

1. New Construction	31
2. Rehabilitation	31
3. Major Maintenance	32
4. Equipment Utilization and Replacement	32

5.	Communications Systems	33
6.	Computer Systems	Nothing to Report
7.	Energy Conservation	Nothing to Report
8.	Other	Nothing to Report

J. OTHER ITEMS

1.	Cooperative Programs	33
2.	Other Economic Uses	Nothing to Report
3.	Items of Interest	34
4.	Credits	34

K. FEEDBACK

Nothing to Report

A. HIGHLIGHTS

John Koerner retired on April 3rd after almost 32 years of service with the FWS. A retirement party was held for John and Cindy on the afternoon of the 3rd at the Columbia Legion Hall with over 150 people in attendance (E-1).

R-9, Division of Engineering, Brian Becker began his temporary duty assignment as Acting Project Leader at Sand Lake on 5/19. (E-1)

Sand Lake received a new Project Leader as Gene Williams from Lake Andes NWR came on board in October and a new Wetland District Manager, Jay Peterson, from LaCreek NWR in September. (E-1).

Scott Glup heads east to Litchfield WMD to assume new duties as Project Leader (E-1)

New Zone Supervisor Rod Krey visits the Sand Lake Complex (E-8).

Christmas Bird Count is held on December 16th (G-1)

Another bald eagle nest is confirmed in Brown County. (G-2)

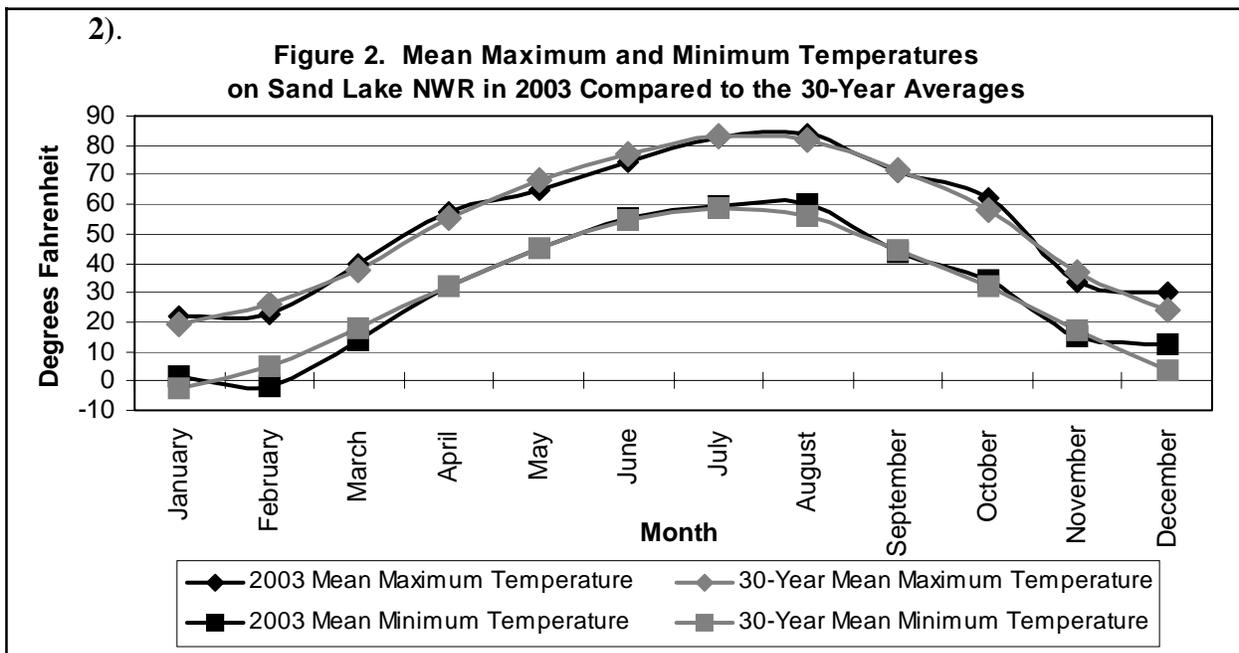
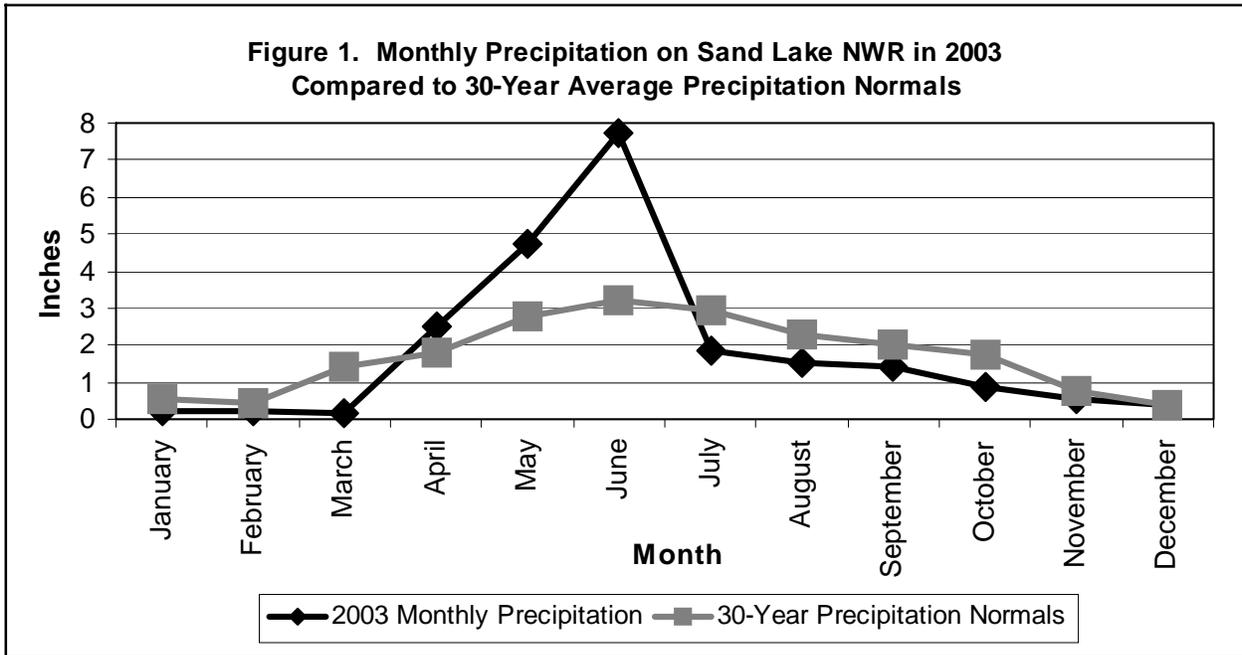
Iced-up neck collars blamed for death of snow geese (G-3).

The performance of the “Prairie River Reflections” debuts at Wylie Park on July 4th as part of the Centennial Celebration. (H-1)

B. CLIMATIC CONDITIONS

The year started off with dry conditions, following 2002 as the 13th driest year on record in South Dakota (1895-2002). That drought continued through the winter of 2003. Total precipitation for January, February, and March combined was 1.8 inches below the 30-year average for those three months. In April, the drought broke and the rains began to fall. For the next three months, the Refuge would consistently receive precipitation above the monthly averages. The rainfall reached a crescendo in June, with 7.74 inches of precipitation (over 4½ inches above the 30-year monthly average). Plans for a managed drawdown of the Sand Lake impoundment were officially canceled as water levels in Sand Lake impoundment peaked at 0.7 feet above full pool at the end of May and remained high through early July. In May, the western portion of Sand Lake WMD finally pulled out of a drought defined as moderate according to the Palmer Drought Index. Many dry wetlands began to fill on the District and the vegetation thrived providing excellent food and/or cover for wildlife. In July, the rains subsided once again. By August, range conditions on the western portion of the District had slipped back into severe drought conditions which remained, along with below-average precipitation, for the rest of the year. Despite the dry conditions at the end of 2003, the total annual precipitation of 22.24 inches was 1.94 inches above the 30-year average due to the heavy spring rains (**Figure 1**).

Monthly temperatures were usually within several degrees of the 30-year average (**Figure**



In October, the staff enjoyed a beautiful Indian summer, which included several 80+ degree days. On November 4th, Sand Lake and Mud Lake froze over. December treated us well with temperatures substantially above average.

C. LAND ACQUISITION

Nothing to Report

D. PLANNING

1. Comprehensive Conservation Plan (Master Plan)

As the year began, questions still remained as to what should constitute the emphasis of each of the management alternatives. Several meetings helped shape the three alternatives as the year progressed. A large portion of the discussion at these meetings revolved around how the CCP should address management of the Refuge croplands. Several members of the Core Team met with the South Dakota Game, Fish and Parks (SDGFP) in March and again in December to discuss the Refuge farm program and options for managing resident wildlife on Sand Lake. In addition, Ron Shupe, Bob Barrett, Mike Spratt, and Rod Krey all made trips to the Refuge to discuss these issues and others. After a layoff for the spring/summer field season, Adam Misztal visited Sand Lake in July to re-focus on the CCP. Over the next several months, the Core Team wrote or revised a substantial portion of the CCP. In November, Adam and the Core Team developed the Alternatives Matrix, which summarized the issues, impacts, and benefits of each alternative. With the cropland issue still in contention, the Core Team developed a “white paper” to fully address the need to use cropland as a management tool to control Canada thistle and renovate degraded uplands. By the end of December, the Environmental Consequences section was almost complete and draft maps had been developed with the assistance of Sean Fields. The Draft CCP had come a long way and only a few sections still remained to be completed.

2. Management Plan

Nothing to Report

3. Public Participation

The annual Sand Lake Deer Committee Meeting was held in Aberdeen on March 12. The Refuge Staff solicit input from the local conservation groups concerning management of the Sand Lake whitetail deer herd. Members of the Whitetail Bowmen, Whitetails Unlimited, Brown County Sportsmen’s Club, and the Hecla Sportsmen’s Club, and a few landowners adjacent to the Refuge meet annually with Refuge officials and the SD Game, Fish, and Parks biologists. Input from the meeting is used to make season setting decisions. The committee’s recommendation was to leave the season structure and tag numbers the same as 2002.

4. Compliance with Environmental and Cultural Resource Mandates

Zone Archeologist Brant Loflin inspected a grain elevator acquired at the time of Refuge establishment at the Quarters 194 site on 10/16.. Representatives from the SHPO Office also looked at the building. We are trying to make a decision to remove or maintain this building.

5. Research and Investigation

Effects of Seeding Mixtures on Abundance of Breeding Birds

This is the final year of a three year study conducted by personnel at Northern Prairie Wildlife Research Center. The objective of the study is to compare densities and species composition of breeding birds between grassland fields seeded with native mixtures and those seeded with introduced mixtures. Four grassland plots are located on Sand Lake NWR. A final report will be forthcoming.

Sedimentation Rates in the Marshes of Sand Lake National Wildlife Refuge

We received the final report for the Quick Response study conducted by personnel at Northern Prairie Wildlife Research Center in 2000. Four cores were taken from areas in Mud Lake where sediment deposition from the James River was expected to prevail. The core samples were then sent to the U. S. Geological Survey's Center for Coastal Geology laboratory in St. Petersburg, Florida, for isotopic analyses. Results indicated that sedimentation accretion rates were greatest near the Mud Lake Dam, where approximately 55 cm of depth has been lost since 1959. The conclusion suggests that within the next 20 years, water depths will reach a critical threshold where cattail stands will quickly dominate remaining open-water areas outside of the river channel. Future recommendations include assessing current sedimentation rates in Sand Lake. Alternatives addressing the sedimentation issue are being analyzed in the Refuge CCP.

6. Other

Flanders met with Doug Johnson and Wes Newton of Northern Prairie Wildlife Research Center concerning the development of a Habitat Monitoring Plan for Sand Lake NWR. Following the meeting at Northern Prairie, Jave, Schultze, and Flanders met to discuss their suggestions for the Habitat Monitoring Plan and Habitat Objectives.

E. ADMINISTRATION

1. Personnel

The big news for the year was that Project Leader John Koerner retired on April 3 after serving at Sand Lake since 1988. The Refuge staff, friends, family and FWS employees gathered at the Columbia Legion Hall on April 3rd to honor John retirement. John's long career with the Fish and Wildlife Service has cultivated many fond memories and it is our hope that his retirement party will be among them.

Table 1 depicts the employees who were on duty in 2003.

Table 1. Sand Lake Refuge Employees

Employee Name and Title	Entered on Duty	Status
John Koerner, Refuge Manager (Retired April, 2003)	4/88	PFT
Eugene Williams, Refuge Manager	10/03	PFT
John Jave, Primary Assistant	1/92	PFT
Scott Glup, Wetlands Manager (Transferred June 2003)	12/92	PFT
Jay Peterson, Wetlands Manager	9/03	PFT
Marcia Haaland, Administrative Officer	8/88	PFT
William Schultze, Wildlife Biologist	5/76	PFT
Beth Ullenberg, Outdoor Rec Planner	12/99	PFT
Neil Powers, ROS	01/01	PFT
Donald Soderlund, ROS	12/01	PFT
Allen Olson, Wildlife Biologist (Private Lands)	10/97	PFT
Bridgette Flanders-Wanner, Wildlife Biologist (Trainee)	07/02	PFT
Berle Meyers, Heavy Equipment Operator	4/71	PFT
Ronald Frohling, Carpenter	5/77	PFT
Eric Hoggarth, Biological Technician	5/02	PFT
Josh Wagers, Biological Technician	5/03	Temp
Joel Wilson, Biological Technician	5/03	Temp
Tammi Imm, Biological Technician	5/03	Temp
Ryan Smith	5/03	Temp

The Refuge hired four seasonal employees on 180 day appointments. Joel Wilson entered on duty for the summer on 5/5 while Ryan Smith, Tami Imm and Josh Wagers began work on 5/12.

Amy and Neil Powers are the proud parents of a son Jaden James born on May 5.

R-9, Division of Engineering, Brian Becker began his temporary duty assignment as Acting Project Leader at Sand Lake on 5/19. Brian was participating in the Region 6 Step Up To Leadership Program. Brian lived with his family in Refuge Quarters 194. Brian Becker ended his detail at Sand Lake on 7/18. We enjoyed working with Brian and believe he appreciated all of his new Refuge experiences. A noon lunch with a staff send off was held on 7/17.

Wetland District Manager Scott Glup accepted the position of Project Leader for the Litchfield WMD in Minnesota. His reporting date was June 1. A staff going away party was held on 5/10. His last day at Sand Lake was 5/30.

Bridgette Flanders and Greg Wanner were married on Saturday, June 21, in Medora, North Dakota. Congratulations Bridgette and Greg!

Recruiting and interviews were completed in July for the Wetland District Manager position vacated by Scott Glup. Jay Peterson, the Primary Assistant at Lacreek NWR, was selected to fill the position. He joined the staff on September 21 and moved into Refuge Quarters 194. Jay has had a lot of experience on refuges and it is nice to have him on the staff.

Gene Williams, formerly the Lake Andes Project Leader, was named the new Project Leader for Sand Lake and reported to duty on October 5.

2. Youth Programs

Nothing To Report

3. Other Manpower Programs

Nothing To Report

4. Volunteer Program

Sand Lake's Volunteer Program continues to be a vital program that supports all aspects of the Refuge. This year we had 23 volunteers that contributed a total of 791 hours worth of work in a variety of programs including visitor services, outreach, biology, and maintenance.

Volunteers are tremendously essential in supporting and promoting the Refuge to the local community, especially through outreach efforts. Each year volunteers help staff outreach booths at the Great Outdoors Show and the Brown County Fair, two large county events that draw over 250,000 people. They staff the Visitor Center on weekends during peak migration and assist with special events such as Eagle Day, International Migratory Bird Day and the Christmas Bird Count. This year the Maids & Spades 4-H Club monitored bluebird boxes on the Refuge and even won an Outstanding 4-H Club Award for their volunteer work.

5. Funding

The fiscal year ended with few problems encountered. We were able to contribute \$5,000 towards the North Dakota airplane account and below is a breakdown of the last 3 year's of station funding:

FY	1121	1231	1261	1262	6860	Fire	Total
2003	64,800	3,500	870,300	186,100	3,800	7,600	1,136,100
2002	54,000	3,500	811,600	153,300	3,800	14,214	1,040,414
2001	107,100	4,900	698,420	116,000	3,800	48,100	978,320

A 2004 MMS project to build an addition to the existing shop was cancelled and a project proposal for a new shop will be included in the 2004 MMS update. The money for the shop addition will be applied to another MMS project for 2004.

6. Safety

A station 1995 Ford extended cab 4x4 pickup license # I-257126 was totaled in a rollover accident on the WMD after the driver lost control on a patch of ice on a rural McPherson County road on 2/6. The Fish and Wildlife Service valued the vehicle at \$1,921. The driver was wearing his seatbelt and only sustained minor abrasions.

Heavy Equipment Operator Berle Meyers completed staff equipment certifications for Huron and Madison WMD's in May.

A station safety and environmental health and compliance review was conducted at the station by Jim Bierman and Shirley Miyake, Region 6 Safety Office, on September 24. A number of items were found that needed corrective actions. A report was submitted in December to the Safety Office outlining an action plan to correct these deficiencies.

Several new safety items were purchased to abate deficiencies including spill pallets for portable fuel tanks, a new parts washer, and spill containment for the fuel can/oil storage area and battery storage area. Electrical wires in the new storage building were placed in conduit.

The station held several safety meetings during the year. Subjects included winter driving, back safety, load securement, seatbelt use, and ergonomics in the work force.

The basement of Refuge Quarters 194 was tested for radon in November. Radon abatement equipment has been in place and operating for many years in all Refuge quarters with basements. This test indicated radon levels were within safe limits.

7. Technical Assistance

Wetland District Manager Peterson was appointed to a team of resource biologists to assist in writing a bald eagle management plan for South Dakota. In December he provided bald eagle nest data and other information to Carol Aron, principal writer of a SD Bald Eagle Management Plan.

In December Peterson reviewed a Preliminary Report Of Findings -Contaminant Assessment Process for the wetland management district. Minor changes and comments were submitted back to the Ecological Services office in Pierre.

8. Other

Koerner, along with other Project Leaders from South Dakota, met with Governor Rounds, John Cooper, and Doug Hanson to witness the Governor signing the proclamation commemorating the Centennial year of the NWRS.

A ND/SD Project Leaders Meeting was held in conjunction with the SD Wildlife Society Meeting in Aberdeen on March 5-6.

Regional Chief of Refuges Rick Coleman, Deputy Supervisor Bob Barrett, and EVS Specialist Cindy Souders toured Sand Lake on March 7 and spent time with the staff answering questions.

Project Leader John Koerner was awarded a special achievement award at the project leaders meeting for his many contributions to the FWS and to conservation in general.

Refuge neighbor Chuck Knecht visited the office on 3/24 to submit a tort claim for herbicide damage to his soybeans for \$3792. The property he rents is just south of the Refuge by Goose Corner. The Refuge did spray herbicides to control Canada thistle across the road from Mr. Knecht's soybeans. An offer of \$1038 was extended to Mr. Knecht based on a yield loss of 15 bushels/acre loss on 12.5 acres along the Refuge. At year's end the claim had not been settled. Mr. Knecht could not produce any evidence that documented his loss; however, he said he plans on taking the FWS to court.

Deputy Project Leader Jave attended the Board of Directors meeting in Bismarck and Zone Supervisor Ron Shupe's going away party on 7/9. Ron will now supervise the stations located in Colorado, Kansas and Nebraska.

Project Leader Williams visited the offices of U.S. Senators Daschle and Johnson in Aberdeen, introducing himself to most of the respective staff members in October. Williams also visited with available staff at the Aberdeen Game, Fish, and Parks Wildlife Division office.

New Zone Supervisor Rod Krey visited the Sand Lake Complex for the first time on 11/19. The staff had an opportunity to visit with him. He had a short tour of the Refuge, discussed new policies, and the station CCP.

Williams attended a Board of Directors meeting in Jamestown, ND, on December 10-11.

F. HABITAT MANAGEMENT

1. General

The winter of 2002-2003 was very dry and little snow was received so wildlife endured an easy winter. Little runoff from snowmelt was recorded, but good spring rainfall benefitted the Refuge grasslands which provided good nesting cover. Because of the overall dry conditions, Brown County maintained a ban on open burning. Crops grown on the Refuge for wildlife did very well. By mid-summer the dry conditions caused some shortfall of pastures and hay crops. The dry weather continued through the fall and the harvest progressed on schedule around the Refuge.

2. Wetlands

Water management plans for the year were to hold Mud Lake near full pool level and draw Sand Lake down, if conditions allowed, to continue the re-establishment of emergent vegetation in Sand Lake after the small gains made in 2002 (**Figures 4 & 5**). There was very little spring runoff from the limited snowfall we received this winter. But plentiful rain in April and May brought Mud Lake to a peak of about 0.9 foot above full pool level(FPL), and Sand Lake to a peak of about 0.7 foot above FPL on May 29. Heavy rains continued through June, along with increased releases from the Jamestown and Pipestem Dams. At this point, it was obvious that the drawdown was not possible, and we attempted to hold water levels stable near FPL, to avoid flooding out any overwater nesting birds. At freeze-up, Mud Lake was approximately 0.5 foot below full pool level, and Sand Lake was approximately 0.8 feet below full pool level.



Figure 4. The drawdown in Sand Lake in 2002 created some ideal waterfowl feeding areas when reflooded this spring. WAS



Figure 5. and some emergent vegetation regeneration. WAS

3. Forests

Nothing to report.

4. Croplands

Sand Lake NWR has historically conducted a large farming program to meet the food requirements of migrating waterfowl and to provide food for resident wildlife. In 2003 the farm acreage remained at 1220 acres. The station's Comprehensive Conservation Plan is still in the draft stages. However, plans call for the continued downsizing of this program with more emphasis placed on using farming as a tool to establish seedbeds for grassland renovation/establishment. Excess cropland will be seeded to native and tame grassland.

The shares are based on a 75:25 cooperative farming agreement with the Refuge's share generally left in the field as standing corn for wintering wildlife. Cooperators are allowed to harvest what is left in the spring and it is divided 50:50 with the government.

Table 2. Sand Lake Cooperative Farming Summary, 2003

CROP	ACRES	COOP SHARE (ACRES)	FWS SHARE (ACRES)
Corn	587.75	311	277
Soybeans	561.75	561.75	0
Spring Wheat	50.5	50.5	0
Millet	8		8
Idle	14		
Total Acres	1222	923.25	285

Jave met with the Brown County FSA office to discuss the FWS policy for farm cooperators participating in USDA farm programs on 1/6/03. Cooperative farmers are prohibited from participating in USDA farm subsidy programs involving Refuge cropland except for crop insurance on their share of the Refuge crops.

Notice was given in October to Refuge coop farmer Kent Webb that his contract would not be renewed for 2004. The Refuge is continuing the process of downsizing the farming program as policy and Refuge objectives change. Some of this cropland will be seeded to native grass and forbs in 2004.

The future of the Sand Lake farming program on Sand Lake NWR has been the source of much review and attention during the present Comprehensive Conservation Planning effort. The draft plan calls for a reduction in the cooperative farm program to 400 acres for resident wildlife. This amount will be flexible as additional acreage will be farmed to prepare seedbeds for grass seeding.

5. Grasslands

The grasslands on Sand Lake Refuge consist of mostly cool season exotics because virtually all of the original prairie was plowed for crops by the pioneers. These grasslands are in need of renovation. Because Canada thistle tends to invade new seedings, we have put our emphasis in managing our existing stands of grass. Native grasses have been restored where conditions and funding permit. However, a program of establishing native forbs has not been undertaken because of the Canada thistle problem. The feasibility of establishing forbs will be evaluated as we review our land management direction through the CCP process. In 2004 we plan on experimenting with adding forbs to our seedings. We will have to begin a systematic program to renovate our DNC fields in spite of the Canada thistle problem.

Trainee Biologist Flanders worked on establishing a Sand Lake Grassland Monitoring Plan during the year. In April she met with Doug Johnson and Wes Newton of the Northern Prairie Wildlife Research Center. Vegetation transects for the Habitat Monitoring Plan began on May 28th. In June all major grassland blocks on the Refuge were monitored in the initial phases of establishing the Refuge habitat monitoring program. In September Flanders-Wanner finalized the Habitat Monitoring Map on ArcView. The map delineates habitat blocks of the three major habitat types on the Refuge and indicates the location and direction of permanent monitoring transects for future habitat monitoring. In addition, Russian olives have been invading Refuge grasslands. An ArcView map was developed as a tool to help prioritize Russian olive removal efforts on the Refuge.

No new grass native seedings were done on the Refuge in 2003. For years we have been reducing our cropland acreage and seeding it to grass in the areas that are most favorable for nesting waterfowl. In 2002 it was decided to call a moratorium on grass seeding to see what direction our CCP planning process would take us. Plans are to resume retiring cropland and seeding it to native grass in 2004.

Eighty acres of DNC in four units were seeded in August. The units were disced several times to break up the sod and then seeded to a DNC mix of alfalfa, sweetclover, intermediate wheatgrass, and tall wheatgrass. This method will rejuvenate the stands, but noxious weeds will continue to be a problem.

6. Other Habitats

Nothing To Report

7. Grazing

A total of 301 acres of grasslands was grazed on the Refuge in 2003. Most of the grazing units consisted of a mixture of upland and lowland native areas and mature DNC seedings. High bids for the units ranged from \$2 to \$13.25 per aum.

Table 3. 2003 Grazing, Sand Lake NWR

UNIT	TYPE	ACRES	TOTAL AUM'S	PERIOD
03-1	Brome/Marsh Edge	65	104	5/14 - 7/12
03-2	Brome/Marsh Edge	180	225	6/12 - 10/12
03-3	Brome	90	90	5/15 - 7/15
TOTAL		335	419	

8. Haying

Eight tame grass units totaling 188 acres were hayed in 2003. All were brome DNC units or marsh edges. There was considerable interest in hay on the Refuge. One cooperator had the high bid for 6 of 8 units and all his bids ran from \$22.95/ac to \$25.00/ac. We have no limit on the number of units that can be bid on by one person. This particular permittee did a very poor job of haying and skipped stands of Canada thistle. New special regulations to guard against this will be in place for the next season. Several of these units were renovated by dicing several times and then fall seeded to a DNC mix.

9. Fire Management

Certain staff that were qualified for fire duties attended a one day fire refresher at Tewaukon NWR on 4/1. Hoggarth, Flanders and Jave completed the pack test on 4/8.

The Brown County Commissioners placed a season long ban on all open burning in April. As a result no burns were conducted on the Refuge in 2003. Much of the summer was very dry and the huge cattail stands on Sand Lake poised a wildfire danger.

Bio Tech Eric Hoggarth was detailed on a fire assignment to CMR National Wildlife Range on 9/3 and returned on 9/15.

Jave represented the Refuge at a meeting on 10/15 to kickoff planning for a Brown County Fire Plan funded by the FWS. Brown County was selected because of its' wildfire history and the number of acres of Fish and Wildlife Service lands.

Collateral firefighters Jave and Peterson responded to a wildfire that was reported to be on a WPA in Brown County. The office was called by a dispatcher from Brown County on Oct. 21 at 1630 hours. A second call resulted in the same information. Upon arrival at the fire scene, it was determined that the fire was adjacent to the Proud WPA separated only by a blacktop road. Many engines were on the scene protecting the numerous houses and farmsteads in the area. Jave and Peterson provided re-con work and conducted mop-up activities. The wildfire burned through pastures and a large type 4 wetland complex consisting of very heavy and dense type 3 fuels of cattails and phragmites threatening many structures and unharvested corn fields. Fire activity was very intense even though the winds were very light. The fire jumped a well maintained gravel road through these heavy fuels. Power poles were burned, many trees caught fire, and some fences were burned. No other major damage or personal injuries were reported. The fire size was estimated at over 400 acres.

10. Pest Control

Canada thistle and leafy spurge are the primary noxious weeds that are controlled on the Refuge. ATVs are used to spray leafy spurge patches while pickup sprayers are used on the Canada thistle. The principle chemicals used were Plateau on leafy spurge and curtail and a tank mix of tordon-2,4-D was used on Canada thistles. Mowing was done in late July/early August to prepare thistle patches for a fall application of herbicide. These will be sprayed in the spring of 2004 because we did not get all the fall spraying accomplished.

In 2003, most emphasis on treating noxious weeds was placed in the Wetland Management District and not on the Refuge. Only 38 acres and 39 lbs. of AE were sprayed for noxious

weeds in 2003 on the Refuge. This compares to 1696 acres in 2002. The widespread use of herbicides has reduced our plant diversity as well as being exceedingly expensive.

Soderlund and Powers took required pesticide applicators tests at Brown County Extension Office in February.

Soderlund and Powers completed 6 Pesticide Use Proposals in a new required format and a Section 7.

G. WILDLIFE

1. Wildlife Diversity

Sand Lake National Wildlife Refuge, with its vast expanses of emergent vegetation mixed with open water, illustrates the unequalled diversity of a prairie marsh ecosystem. The slow-moving James River is the key in providing this habitat to the diverse wildlife species on the Refuge.

2. Threatened and/or Endangered Species

Bald eagles could be observed on the Refuge throughout the year. Numbers of eagles build during the spring and fall waterfowl migrations. There were six active bald eagle nests in Brown County this year, of which five fledged a total of 8 young. Three of these are within several miles of the Refuge. Two of the six nests were blown out of the trees during high winds in late July. Eagles had rebuilt one of these by fall.

3. Waterfowl

a. Production

Pair habitat on the Refuge was limited this spring, but improved early in the summer with the precipitation we received.

This was the thirteenth year of operation of the headquarter's predator enclosure. A total of 114 waterfowl nests were located in the enclosure: 68 mallards, 23 blue-winged teal, 12 gadwalls, 7 Canada geese, 2 northern pintail, and 2 northern shoveler. Of this total, 51 were successful resulting in an apparent success rate of 45%.

b. Migration

The spring migration started on March 14th, when the first Canada geese and a few white-fronted geese were observed. A few small flocks of snow geese showed up on the 15th, and numbers built to 20,000 by the 17th. Numbers grew to 300,000 by the 23rd, and remained near that number through the 26th. Numbers dropped to around 100,000 by the end of March. Most of the duck species were observed on the Refuge by the end of March

The fall migration began with snow geese moving into the Refuge near the end of October. Numbers increased to only 8500 by month's end, but quickly peaked at 210,000 on November 2, just prior to a storm that moved through the Dakotas. Snow

goose numbers remained near 100,000 through November 20. Most of the snows were gone by November 25.

Canada goose numbers peaked at 3000 on November 2. Approximately 850 remained on the Refuge at year's end.

Duck numbers rose to 135,000 in October, and peaked at 150,000 on November 2. Numbers dropped considerably following the storm on the 3rd. Five hundred mallards were still using the Refuge at the end of the year.

Swan numbers peaked at 800 on November 2.

4. Marsh and Water Birds

We attempted another draw-down in Sand Lake this year to continue the regeneration of cattail begun with last year's draw-down. But rains in May and June and releases from the dams in North Dakota prevented us from reaching our draw-down goals.

After the water in Sand Lake rose in May, overwater nesting birds began nesting in some of the emergent vegetation. There was a colony of 1000 egrets (mostly cattle egrets), and 250 white-faced ibis, and several hundred Franklin gulls in the northern part of Sand Lake, near the east side of the lake. Western grebes also nested in some of the newly established vegetation.

5. Shorebirds, Gulls, Terns and Allied Species

As of 2003, four consecutive years of shorebird survey data have been collected on Sand Lake NWR. In 2003, shorebird surveys began on April 9 and extended through October 23. Primary goals were to attain information on shorebird migration patterns and their response to water level manipulation.

A total of 4,660 shorebirds were counted in 2003. Greatest numbers were counted for dowitchers spp. (2,379), killdeer (745), semipalmated sandpipers (367), pectoral sandpipers (319), and yellowlegs spp. (255). Shorebirds are counted only on the designated survey sites, as opposed to all shorebird habitats on the Refuge. Also, lengths of stopovers during migration are usually much shorter than the intervals between surveys (many shorebirds only use a staging area for 2 to 3 days before continuing migration). Therefore, the actual number of shorebirds using Sand Lake NWR during the migration is much higher and the total number of shorebirds counted in 2003 is best used as an index of annual shorebird use.

According to the index, shorebird use during the 2003 spring migration was 6% of that counted in 2000, 10% of that counted in 2002, and 209% of that counted in 2001. These differences in spring shorebird use between years can largely be explained by differences in pool elevations in the main pools on Sand Lake NWR. Spring pool elevations in 2000 and 2002 were lower than levels in 2003, which corresponds with the higher spring shorebird use during both those years. Conversely, spring pool elevations in 2001 were higher than in 2003, which corresponds to the lower spring shorebird use during 2001. Thus, it appears that a strong negative correlation exists between pool elevations and spring shorebird use.

Similarly, a negative correlation exists between pool elevations and fall shorebird use. According to the index, shorebird use during the 2003 fall migration was 22% of that counted in 2002, 85% of that counted in 2000, and 116% of that counted in 2001. Lowest pool

elevations during the fall occurred in Sand Lake pool during 2000 and 2002, which corresponds with the higher fall shorebird use during both those years. Conversely, the highest pool elevations during the fall occurred in Mud Lake pool in 2001, which corresponds with the lower fall shorebird use during 2001.

Shorebird counts during the spring migration were low and irregular. The first high spring count on April 17th was largely comprised of Baird's sandpipers on the Display Pool and Columbia Marsh. The second high spring count on May 30th consisted of mostly semipalmated and white-rumped sandpipers on the Display Pool. The bimodal high counts do not seem to be related to pool elevations. Records of spring pool elevations do not indicate that shallower water, which provides improved foraging habitat, occurred during those two periods.

However, the two peaks do seem to correspond with the spring migration chronology of those three calidris species. Baird's sandpipers migrate north in late April to early May, while semipalmated sandpipers do not begin to migrate through until May and white-rumped sandpipers do not migrate through until mid to late-May. The early migration of Baird's sandpipers followed by a later migration of semipalmated and white-rumped sandpipers in 2003 is consistent with the migration chronologies of these three species in 2000 and 2002, as well. Therefore, it is reasonable to believe that the two isolated peaks in the 2003 spring migration can at least be partially explained by a separation in the migration chronology by species.

The height of the fall migration appeared as one prominent peak in shorebird numbers between August 8th and September 17th. This peak can partially be correlated to the peak in fall migration of shorebirds through the Midwest. However, the fall migration is generally extended and much less pronounced than the fall migration through Sand Lake NWR in 2003. This "spike" in shorebird numbers was comprised of mostly long-billed dowitchers, a common fall migrant through the Refuge. An exception occurred on August 20th, when the shorebird survey was dominated by calidris and allied species, particularly pectoral and semipalmated sandpipers. Improved foraging habitat for dowitchers and other shorebirds due to a noticeable decrease in water levels between August 26th and September 11th could have contributed to the prominent peak in fall migration during that same period.

A majority of the birds counted during the fall migration were located on five survey sites. Dowitchers, which totaled 2,374 during the fall migration, were most prevalent in the Display Pool, Flood Control Pool #1, South of Hecla Grade, and on Dry Run. Pectoral and semipalmated sandpipers totaled 301 and 218 during the fall migration, respectively. These calidris species were most prevalent at Other Locations on Route. Almost all of those shorebirds counted on Other Locations on Route were counted on a backwater wetland of the James River and Mud Lake.

Killdeer, which totaled 501 during the fall migration, were counted in large numbers on all five of the aforementioned survey sites. However, as a summer resident in the Prairie Pothole region, their numbers remain stable throughout the migration. Therefore, they did not contribute to the peak in fall migration. These five survey sites were the only areas on the Refuge that were visible from the survey route and had shallow water and sparsely vegetated mud flats for foraging shorebirds during the fall migration.

Several hundred Franklin gulls nested along with cattle egrets and white-faced ibis in northern Sand Lake.

6. Raptors

Nothing to report.

7. Other Migratory Birds

Nothing to report.

8. Game Mammals

The white-tailed deer population in and near Sand Lake NWR appears to be increasing slightly.

Two hundred ninety one deer were counted during a deer spotlight survey on October 15. This compares to 205 deer observed during last year's survey. Substantial damage to neighboring cornfields was noted on the west side of the Refuge north of Highway 10. One neighbor stopped at the office to complain about crop damage in late summer. He did have significant damage during the growing season.

Deer hunting seasons are discussed in Section H.8.

10. Other Resident Wildlife

Ring-necked pheasant numbers are high in and around Sand Lake NWR.

11. Fisheries Resources

There was a partial fish winterkill in Sand Lake during the 2002/2003 winter due to the low water levels. Bald eagles feasted on many of the dead carp during the spring migration.

12. Wildlife Propagation and Stocking

Nothing to report.

13. Surplus Animal Disposal

Nothing to report.

14. Scientific Collections

Nothing to report.

15. Animal Control

Trapping was conducted within the headquarter's predator enclosure. Eight skunks and four raccoons were eliminated.

16. Marking and Banding

A total of 2,754 ducks was banded during the pre-season duck banding at Sand Lake (**Figure 6**). The banding site near the Columbia Marsh was not used due to low water levels in that marsh. Two nets were set up at the Mud Lake site, and one net was used at the Highway 10 site. The nets were shot 7 times at the Mud Lake site and 6 times at the Highway 10 site from mid-August through mid-September. **Table 4** summarizes the species, sex, and age of the ducks banded.

Figure 6. Banding ducks at the Mud Lake site. WAS

Table 4. Ducks Banded in 2003

Species	AHY-M	HY-M	AHY-F	HY-F	Total
Mallard	847	188	1031	239	2305
Pintail	35	68	143	78	324
BW Teal	30	19	21	15	85
Wood Duck	20	2	7	2	31
Wigeon	0	0	6	0	6
GW Teal	2	0	1	0	3
Total	934	277	1209	334	2754

17. Disease Prevention and Control

The West Nile Virus continues to be a concern in the area. We attended a state sponsored Mosquito Control and West Nile Virus Workshop in Aberdeen in April. This year, there were a total of 90 human cases reported in Brown County resulting in 1 death. The virus was first detected in South Dakota in 2002 from a crow in Brown County. A total of four human cases were confirmed in Brown County in 2002.

Seventy one dead and sick birds(mostly pelicans) were picked up on Mud Lake and Sand Lake from July through September.

Chronic wasting disease(CWD) in white-tailed deer continues to be a concern in the state. The first case of CWD in South Dakota was in a captive elk facilities in McPherson County, just west of Brown County, in November, 1997.

H. PUBLIC USE

1. General

Each year over 50,000 people visit Sand Lake Refuge. Visitors participated in a variety of activities including wildlife observation, education, hunting, fishing, photography, hiking, and auto touring. The Refuge continues to draw visitors from all over the country as well as many foreign visitors.

The Refuge Visitor Center is open to the public year round Monday through Friday 8:00 am to 4:30 pm, except holidays. Through the support of volunteers it is open several weekends in March and April during the peak of the spring migration. Volunteers and Refuge personnel welcomed visitors from 10-4 each day.

Many annual special events take place at Sand Lake including Eagle Day, the Refuge's annual open house event which was held March 25. Over 1,000 people attended. The Raptor Center from the University of Minnesota brought over four raptors including a bald eagle. Other activities included guided wildlife tours, horse and wagon rides, kids activity table, interactive exhibits and displays, The Wildlife Wizard, Honker the Blue Goose and more. International Migratory Bird Day and National Wildlife Refuge Week were also celebrated.

a. Outreach

The year 2003 was the Centennial anniversary of the National Wildlife Refuge System and Sand Lake promoted the Centennial at every event it held or participated in during 2003. Many additional outreach events were to honor the Centennial. In 2003, Sand Lake hosted the annual meeting for The South Dakota Chapter of the Wildlife Society whose theme was the Centennial Celebration. The three day meeting was held at the Ramkota Inn in Aberdeen. ORP Ullenberg and PL Koerner worked on obtaining speakers for the Monday afternoon programming which was dedicated to the NWRS and the banquet speaker. Speakers on Monday included James Kurth, WO, Refuge Chief, Paul Gertler,RO6, Photographer Bill Marchel, and Tony Dean among others. The highlight of the meeting took place at the banquet when a Teddy Roosevelt impersonator wowed the crowd with his presentation as TR himself.

Sand Lake hosted an Open House on March 14, 2003, the actual anniversary of the beginning of the National Wildlife Refuge System. In the morning over forty 4th graders

from a local school (**Figure 7**) came out for a field trip filled with centennial activities and celebrated with Honker and a blue-goose cake. From 1:00pm to 4:00pm the public was invited to the Open House at Refuge Headquarters.

Sand Lake was also chosen to participate in the American Composers Forum “Continental Harmony Program”. Continental Harmony celebrates communities through music. Funded in part by the National Endowment for the Arts and the Knight-Ridder Foundation, *Continental Harmony* brings composers and communities together to share, build, and celebrate communities! Originally a millennium celebration, the program’s overwhelming success has continued it through 2003. The Forum was scouting for a project in South Dakota and came across our website with the Refuge System Centennial information on it. Also noting that the local newspaper was owned by Knight-Ridder it was felt the Centennial was a perfect match for the Continental Harmony program. Sand Lake partnered with several local organizations including the Dacotah Prairie Museum, Aberdeen Parks, Recreation and Forestry Department, and the Aberdeen Municipal Band. A total of 32 composers applied for our project. The Planning Committee chose Dan Rager from Cleveland, Ohio, to write the piece of music. Dan made several site visits to the area to get acquainted with the community and the Refuge. The piece was premiered by the Aberdeen Municipal Community Band at the 4th of July Celebration at Wylie Park in Aberdeen 2003. Over 2,000 people attended the concert.

2. Outdoor Classrooms - Students

It was another busy year for on-site field trips, although students numbers were again down due to bus service and field trip funding being cut from the Aberdeen school district budget. Sand Lake provides an excellent opportunity for school and other groups to conduct environmental education programs and outdoor learning. Scout groups, 4-H clubs, church groups and bird clubs all use the Refuge for nature studies and wildlife observation.

Over 550 students were taught on-site, despite school district budget shortfalls, to learn about wildlife, the Refuge and habitat conservation. However, the Refuge saw the biggest impact with number of students taught off-site. This number swelled to over 3,000 students, the largest to date! This included in-class presentations, teacher led programs, waterfowl identification portion of the Hunter safety course sponsored by the Sportsman's Club of Brown County, Northern Prairie Water Festival and the James River Water Festival, and other non-annual learning events.

3. Outdoor Classroom - Teacher

No teacher workshops were held this year at Sand Lake.

4. Interpretive Foot Trails

The "Prairie Winds" 3/4 mile interpretive hiking trail, located at the Columbia Day Use Area, has become very popular with the visiting public. The trail traverses a variety of habitats including woodlands, wetlands, lake and grasslands. Signs explain the various habitats and the different inhabitants of these habitats. Many visitors hike the trail while birding at the Day Use Area. It has also become an important educational area. School groups are taken on walks to discuss the different habitats and their importance to the wildlife of Sand Lake. A second education trail is being created at Refuge Headquarters. This trail will be used for school field trips activities, but the general public will also be allowed to hike the trail as well.

5. Interpretive Tour Route

Sand Lake Refuge maintains a 15-mile self-guided auto tour route called Wildlife Drive. The tour route starts at headquarters and winds through a portion of the south half of the Refuge with 12 numbered stops. The accompanying tour leaflet gives visitors an insight into Refuge history and management. Wildlife Drive is extremely popular because it takes visitors through the heart of the Refuge and gets them up close and personal with the wildlife. The North Loop Road offers an additional 20 miles of wildlife and habitat viewing in the northern section of the Refuge. This road, however, does not have any interpretive information or signing along the route.

6. Interpretive Exhibits/Demonstrations

The Sand Lake Visitor Center offers interpretive exhibits and displays depicting the history and wildlife use of the Refuge. Although these displays are older and could be upgraded, they still provide accurate and interesting information to visitors.

Sand Lake also has four other sites that have interpretive kiosks that provide information to visitors. These include an Information Kiosk Pull-Out at Refuge Headquarters, an Interpretive Kiosk at the Columbia Day Use Area, an Information/Brochure Kiosk on Hwy 10, and Interpretive Panels below the Observation Tower at Refuge HQ.

Throughout the year the Refuge contributes staffed exhibits at several special events. The Brown County Fair was a definite highlight with the booth being staffed by volunteers and employees the entire Fair. The Fair drew over 200,000 people. The Great Outdoors Show was also a great outreach event for the Refuge. Sand Lake also provides staff to work at the State Fair booth each year.

7. Other Interpretive Programs

The Refuge Corner, a weekly Refuge update in the Aberdeen American News, keeps the public informed of Refuge issues and goings-ons. The station's website is also updated weekly to reflect changes in wildlife populations, regulations, and special events.

Other interpretive or informational programs were presented to the following: Brown County Sportsman's Club; Northern Prairie Water Festival, James Valley Water Festival, 1,2,3 To The Refuge, Kids Free Fishing Day, and the Aberdeen Rotary Club.

Williams was guest of the Brown County Sportsmen Club on 12-4-03. A short program on Refuge management direction was provided.

Eric Hoggarth completed the annual bird feeder and wood duck box project. Eric constructed 78 bird feeders, 58 wood duck houses, and 4 bluebird houses to be given away at Eagle Day.

8. Hunting

a. Waterfowl

Waterfowl hunting on Sand Lake is restricted to approximately 300 public blinds, with adjacent retrieval zones, located along the Refuge boundary. No interior waterfowl hunting is allowed. Hunters are allowed unarmed retrieval for waterfowl along the Refuge boundary up to 100 yards.

Sand Lake offers both Canada goose and light goose seasons, including a special spring conservation order hunt. An early Canada goose season ran from September 1 -15 with a 5 goose bag limit. The regular Canada goose season opened on September 27 and closed on December 26 with a daily limit of 3 geese. The White-fronted and light goose season ran from September 27 to December 21 with a daily limit of 2 white-fronts and 20 light geese.

The duck season opened on September 27 and closed on December 9, except for Pintails and Canvasbacks which closed on November 4. Bag limits included 6 ducks with no more than 5 mallards (of which 2 may be hens) 3 scaup, 2 redheads, 2 wood ducks, 1 pintail. Five Mergansers were legal with only one being hooded. Coot limit was 15.

A special Resident Youth Waterfowl season was held September 20 and 21 to give local youth a chance to try their hand at waterfowl hunting.

Hunters applying for a special Tundra Swan license through a lottery system were able to hunt swans from October 4 to December 21. The season limit was one.

Hunters generally had a good waterfowl season. Wetlands have been drying up as the drought works eastward. Many wetlands in the vicinity of the Refuge that once held ducks are now mostly dry except of some type 5 wetlands. Snow geese continue to be tough to harvest in the area. Virtually all snow geese that use Sand Lake do not feed in Refuge fields but fly off Refuge. However, it takes very bad weather or windy conditions for hunters to bag many birds.

b. Deer

The Sand Lake archery deer season was open from November 1-7 and December 8-31, 2003. Hunters with a South Dakota archery license may hunt the Refuge as no special Refuge permits are required. The Refuge also participated in a Special Brown County Archery Antlerless Deer season from January 1 -31, 2004.

Permanent tree stands are not allowed on the Refuge. Portable tree stands and climbing devices that do not use nails, wire or bolts for attachment were allowed from the Saturday after Labor Day through January 31 of the following year. This policy is consistent with the South Dakota law restricting tree stands on State Game, Fish and Parks lands.

A hunter orange requirement was added to Refuge regulations in 1991. Firearm deer hunters must wear a minimum of 400 square inches of fluorescent orange on their head, chest and back when hunting on the Refuge. This is much more restrictive than the State's regulation requiring at least one exterior garment of fluorescent orange. Hunters have responded well to this regulation and no hunter orange violations were written this

year.

Hunters also have opportunities during five fall firearm deer seasons on Sand Lake. In 2003 there was 5 seasons with 110 tags per season.. These included one muzzleloading rifles only season with the remaining 4 seasons available to center fire rifles.

Hunter success for the 2003 season was 37%, down from 41% in 2002. This success is in line with recent years when it has been generally in the mid 30% range since 1993. The harvest was 219 deer, down from 241 whitetail deer in 2002. The lack of snow lowered the late season success rate. Many yearling bucks were harvested and there will be some effort to increase the age structure of the buck harvest by reducing the any deer tags and increasing the antlerless deer harvest in 2004.

c. Upland Game

Upland game season on the Refuge usually begins the day following the close of the last deer season on the Refuge. This year the season was open December 8-31. An increased number of pheasant hunters enjoyed a great season. Pheasant numbers were up significantly due to the previous mild winter and dry nesting season. Little snow cover and milder temperatures allowed hunters easy access. Pheasant hunting is popular in the Dakotas and Sand Lake provides outstanding opportunities. The season was also open for sharp-tailed grouse and partridge.

9. Fishing

Fishing is allowed at five locations on the Refuge: the Hecla Day Use Area, at the Highway 10 bridge, the north bridge, Weismantel Grade, and the bridge crossing on Hwy 16. The most sought after fish is the Northern pike with occasional catches of yellow perch, bullheads or walleye.

Fishing pressure on the Refuge varies with water levels and the weather. Flows in the James River were down substantially from previous years. Water levels were low due to drought conditions and a draw down for cattail regeneration. Anglers had success on the Refuge, but not as spectacular as in high water years.



Figure 8. Anglers enjoy a day of “hot” ice fishing on the Refuge

10. Trapping

Nothing To Report

11. Wildlife Observation

Sand Lake Refuge is famed for its spectacular concentrations of wildlife. Spring and fall migrations can be staggering with numbers of individual birds in the millions. Snow geese and other waterfowl continue to be the first rite of spring and draw visitors from all over the midwest. Up to 500,000 snow geese are common on the Refuge in spring along with a wide variety of other bird life. Summers are also a wonderful time to observe wildlife on the Refuge. Over 266 species of birds use the Refuge and 134 species nest and raise young on Sand Lake. Wildlife Drive, a guided 15 mile auto tour route, offers visitors a chance to view wildlife up close and in their habitats. Wildlife photography is also gaining popularity. Several nationally renowned photographers photograph on the Refuge. Many of these photos often end up on the covers of such magazines as DU, Birders World, and more.

12. Other Wildlife Oriented Recreation

Nothing To Report

13. Camping

Public camping is not allowed on Sand Lake. On special occasions, youth or education groups are issued a Special Use Permit to camp at the Columbia Day Use Area south of headquarters. The communities of Columbia and Hecla, both within 15 miles of the Refuge, offer camping opportunities to the public.

14. Picnicking

Although no specific picnicking spot exists on the Refuge, the Columbia Day Use Area is a favorite place for visitors to enjoy lunch. Visitors will also often use the picnic tables outside the Visitor Center.

15. Off-Road Vehicling

Nothing To Report

16. Other Non-Wildlife Oriented Recreation

Nothing To Report

17. Law Enforcement

Law Enforcement activities in the Complex consist mainly of patrolling, checking hunters, and occasionally search and rescue operations. During last fall, at least one of the four Refuge Officers was on duty each weekend from opening day of the waterfowl season through mid-December. Officers patrolled the Refuge and the WMD depending on where activity was occurring. In total, Refuge Officers had approximately 520 hunter contacts in the Complex. Approximately 4 violations were turned over to state officers. Refuge Officers wrote approximately 12 citations to hunters throughout the hunting season. Also issued were a few verbal warnings.

Officers Glup, Powers, Schultze, and Soderlund attended the annual law enforcement in-service at Marana, AZ. New Glock model 22 handguns were issued to all Refuge Officers during 2003's in-service. The .40 cal. Glock 22 is now the standard handgun carried by all 500+ USFWS Refuge Officers.

Soderlund attended Refuge Officer Basics (ROBS) in February. The ROBS course was conducted in a week for the first time(formally 2 week course). The course included lecture on all Acts that USFWS Officers have authority over and many hours of Pressure Point Control Tactics (PPCT). Upon completion of this class, Soderlund has completed all minimum, mandatory requirements for his Law Enforcement credentials.

18. Cooperating Associations

Currently the Sand Lake Wildlife Refuge Association is a DBA(doing business as) of the Booth Society Inc. An agreement was signed with the Booth Society and the Regional Office allowing Sand Lake to sell items purchased by the Booth Society out of a space in the Visitor Center. The Sand Lake Wildlife Refuge Association receives a portion of the profits made from the sale of items to support the Refuge's outreach, volunteer and education programs. The Booth Society Board of Directors is the governing board. This has proven to be a vital partnership with helping the Refuge fund outreach and educational programs.

19. Concessions

Nothing To Report

I. EQUIPMENT AND FACILITIES

1. New Construction

A wood bridge over the Display Pool outlet was constructed by Ron Frohling and Joel Wilson as part of a new EE trail around the headquarters pool area. They also completed a picnic shelter overlooking the Display Pool near the overlook tower. The shelter will also be used for EE activities.

2. Rehabilitation

Sand Lake's Carpenter, Ron Frohling, completed several quarters' improvement projects during the year which included painting the shutters for Quarters 195, and installing steel siding on the garage at Quarters 17. Ron and Eric remodeled the bathroom in Quarters #194 with new sheetrock, tub and surround, vanity, and flooring. Ron also landscaped the yard where needed and seeded grass.

All ground floor windows were replaced with Marvin metal clad windows in Quarters 94 by Zellar Construction under contract with Campbell Supply of Aberdeen. In preparation of Jay Peterson's arrival, Quarters 194 was also repainted, carpets cleaned, and the deck cleaned and stained.

Heavy Equipment Operator Berle Meyers and Eric Hoggarth completed a force account MMS project during September to repair a leaky and flood damaged Columbia Marsh Dike by hauling in clay to re-establish the dike's original lines and grades.

Meyers removed the last of the cement pen structures that were used for the giant Canada goose propagation project. He also removed several Russian olive trees that had volunteered in the Display Pool area.

The summer crew (Wagers, Wilson, Smith, Imm and Cahoy) all helped in the removal and repair of boundary fence throughout the Refuge. The Eichler tract was cleaned up in May. Boundary fence repair was tackled in late summer.

The headquarters solar system had some repairs done to it but with further investigation we learned that it would be more cost effective to possibly replace the system. Information was supplied to Engineering for our MMS solar rehabilitation project. A geothermal heat pump is being investigated to replace the outdated solar system as well as heat a potential future office addition.

3. Major Maintenance

Fifteen fiberglass overhead doors were replaced force account with new metal doors on three Refuge storage buildings as part of a funded MMS project.

Nine wells used for sampling groundwater in the shop area were filled and sealed by Gem Star and Associates for a cost of \$675. The wells were dug to monitor groundwater after an underground gasoline storage tank leaked in the late 1980's. The latest testing indicated that concentrations of chemicals in the water had fallen, and that testing the groundwater was no longer required.

A water leak was located and repaired east of the old office after excessive water use was noted on our water bills.

A gravel contract was awarded to Winburn Construction of Houghton, SD, for 1,900 tons of gravel at a cost of \$5.25/ton that were spread on the Refuge roads.

4. Equipment Utilization and Replacement

The station took delivery of two new Chevrolet extended cab pickups to replace other worn out vehicles in the fleet. Also, Hoggarth traded 3 old Honda ATV's (91, 92, and 93 models) for a new 2003 TRX 450S model even-up.

A new MMS funded Panther airboat was delivered to the Refuge on the 15th of July. A tarp was custom made locally for the new airboat.

A JD 725 front mount mower was purchased from Marshall County Implement in September to replace a similar model.

A flatbed was installed on a 1995 Ford pickup that we received from the Aberdeen WAO.

The station received a fire proof cabinet for the shop and emergency supplies to contain accidental gasoline or oil spills.

Three vehicles that are routinely used for law enforcement activities throughout the Complex were equipped with law enforcement equipment. The new equipment included overhead red and blue flashing lights, wig-wags, PA and siren system, and rear amber lights. This equipment will provide increased officer safety while making hunter contacts, vehicle stops, and other routine law enforcement patrol activities.

A fire rated Browning FN firearm safe was purchased in September to improve the station's

firearm security.

5. Communications Systems

Brown County Sheriff's office gave the Refuge 3 high band portable radios for use by our LE officers. Most county and state agencies no longer communicate on low band. They felt that because of the incidents on the Refuge that it was important to maintain communications. There has been 3 search and rescue operations within the last 2 years on the Refuge.

The Refuge acquired 4 portable digital (RACAL) radios thru the fire program including an EF Johnson to be installed in the fire truck.

A new phone line was added to headquarters and the station's fax number was changed to 605-885-6333. The change was made to avoid conflicts with the hunting information hotline which can become extremely busy at times during the snow goose migration. The fax and the hotline shared the same phone line in the past.

J. OTHER ITEMS

1. Cooperative Programs

Garrison

The "Operating Principles" document was finalized in 1998 and signed by four parties: The Fish and Wildlife Service, the Bureau of Reclamation, the Garrison Conservancy District, and the Dickey-Sargent Irrigation District. This document was developed to guide policy and annual decisions regarding the Oakes Test Area Facility (OTA), a river-side irrigation project located along the James River just upstream of Sand Lake in North Dakota.

The document was developed to ensure Refuge compatibility issues were not overlooked when the OTA diverted water upstream for irrigation purposes. The reason compatibility applies in the first place is that the Garrison Reformulation Act requires that it does apply to any development or operation of a Garrison feature which includes the OTA.

In short, the Operating Principles state that if Sand Lake has not reached its water targets for the year (normally during the run-off season), then water cannot be diverted for irrigation purposes. There is an exception to this, and the exception applied in 2003. The exception states that since Sand Lake was scheduled for a draw-down, and as long as Mud Lake was at or above full pool level, OTA could divert water. Once the draw-down was called off due to increased flows in the James River, an exception was given, as any additional flows in the river could negatively impact overwater nesting birds.

The Operating Principles are designed to give the OTA early notice whether Sand Lake has met their targets. If we have not, and we are not planning any special management practices, then they would have to find a source of irrigation water other than the James River. They could release water from storage in Jamestown Reservoir, or could pump water from underground aquifer supplies for which they have a water right.

James River Coordination

Schultze and Jave attended the spring James River Coordination Meeting in Jamestown, ND, on April 10.

Schultze attended a meeting in Pierre on May 20 to discuss options for providing input for the the proposed EIS by the Corps of Engineers on the James River. Others attending were personnel from Game, Fish and Parks, Ecological Services, and John Koerner. In October, Ecological Services and SDGF&P provided input to the Corps of Engineers as to what should be addressed in the EIS.

2. Other Economic Uses

Nothing to Report

3. Items of Interest

Training

Flanders attended the five-day class, TEC 7114: GIS Design for Refuge Management, at the National Conservation Training Center from January 27-31.

Sand Lake NWR hosted a train-the-trainer load securement training on March 25 - 26. Heavy Equipment Operator Berle Meyers was certified as a trainer from our staff.

Soderlund and Imm attended ATV training in Huron on May 19.

Flanders attended Basic Aviation Training on May 28.

Powers left to attend Refuge Management Training Academy at NCTC. scheduled from 7/20 - 8/8.

All supervisors completed on-line EEO training 'alternate dispute resolution' training during the year.

4. Credits

Haaland wrote sections E5, I6, J3
Schultze wrote sections D5, F2, G1-G27, J1
Ullenberg wrote sections E4, H1-H16, H18-H19
Flanders-Wanner wrote sections B, D1
Soderlund wrote section H17
Hoggarth wrote section I1-I5
Jave wrote section A, D4, E1, E6-E8, F1, F3-F13